

The Effect of Added Nitrogen on Biomass and the Incidence of White Mold From Two On-Farm Research Trials. 1988.

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Five on-farm nitrogen (N) rate research trials were conducted in the North Platte River Valley in western Nebraska. Locations were selected to represent a 35 mile stretch of the North Platte Valley farmland. The objective of the trials was to verify the profitability of added rates of N on dry bean yield. This paper reports the effect of added N on biomass accumulation and development of white mold from two of these trials.

Soil tests were taken at each trial site. Cropping history and soil test results are shown at the bottom of the page for each trial. Anhydrous ammonia was applied in field strips of five rows wide by 100 yds in length at rates of 0, 25, 50, and 75 lb/A after bean emergence. These treatments were randomized and replicated three times at each trial site. Each trial was furrow irrigated. Forty feet of the center two rows of each plot were hand harvested for biomass (total above ground growth including grain yield).

White mold developed in three of the trials. White mold infection was light at location A (the first trial harvested) and was not recorded. Percent white mold infection was recorded for locations B and D. Percent infected plants was calculated by counting the number of plants and/or plant parts infected in 20 feet of the center two harvest rows and dividing that number by the total number of plants present.

The results that follow are for location B with low soil residual nitrogen and location D with medium soil residual nitrogen.

Results for Location B: All added fertilizer treatments taken collectively resulted in significantly more biomass and white mold than the soil residual control. Fertilizer treatment rates greater than 25# did not significantly add to biomass or white mold. The variety Spinel is quite susceptible to white mold. The farmer was aware of this and lengthened the interval between his last two irrigations to allow the soil surface to dry, and was able to minimize the effect of the white mold, holding infection in the field to 9%.

Results for Location D: All added fertilizer treatments taken collectively resulted in significantly more white mold than the soil residual control. However, biomass was not significantly changed by added fertilizer.

### Cropping History and Soil Test Results

Cropping History						Soil Test Results				
Location	Days to Cut	Rotation	Spacing	Variety	Disease	Nitro.	% Org.	Soil pH	Lime	Phos.
A	85	Corn	22"	Beryl	White Mold	Low	0.6	8.1	High	High
B	89	Corn	30"	Spinel	White Mold	Low	0.7	7.7	Low	Medium
C	94	Corn	30"	Beryl	None	Low	1.4	8.3	High	High
D	99	Beets	30"	Beryl	White Mold	Med.	1.1	8.1	High	High
E	114*	Corn	30"	Beryl	None	Low	0.7	7.9	None	High

\*Harred July 18th which delayed maturity by two weeks.

Fertilizer treatment rates greater than 25# did not significantly add to white mold. The variety Beryl is more "farmer friendly" to work with in the presence of white mold. The farmer was aware of this and was able to minimize, with controlled irrigation, the effect of the disease, holding infection in the field to 14%.

### Summary

The amount of biomass was not related to the incidence of white mold in the five trials. However, once the pathogen was established, it increased significantly to added N whether the biomass did or not. At location B with low soil residual nitrogen, the additional biomass resulted from added N was associated with increased white mold. At location D with medium soil residual nitrogen, biomass was not increased by added rates of N, but white mold was increased. White mold did not respond to more than 25 lbs of added N at either location.

White mold developed similarly in a well grown field of Beryl (location D), with one-third more biomass, and in a well grown field of Spinel (location B). In the absence of rain, both growers, with white mold infected fields, were able to time their last irrigation to allow soil surface drying and thus minimize the development of the disease.

### TREATMENT MEANS FOR LOCATIONS B AND D

TREATMENT AND RATE/A	WHITE MOLD		BIOMASS	
	B	D	B	D
	%	%	(LB/A)	(LB/A)
SOIL RESIDUAL N	9.3	14.0	4356	6213
25# ADDED N	20.0	27.3	4660	6400
50# ADDED N	24.0	25.3	4632	6133
75# ADDED N	21.3	28.0	4800	6700
C. V.	39.2	21.6	4.1	5.1

### SINGLE DEGREE OF FREEDOM ORTHOGONAL COMPARISONS OF MEANS FOR LOCATIONS B AND D

TREATMENT COMPARISONS	PERCENT WHITE MOLD	MS	BIOMASS	MS
LOCATION B				
SOIL RESIDUAL VS ALL ADDED N RATES	9.3 vs 21.8	348.44 **	4356 vs 4697	27.32 **
25# ADDED N VS 50 AND 75# ADDED N	20.0 vs 22.7	14.22 NS	4660 vs 4756	0.16 NS
50# ADDED N VS 75# ADDED N	24.0 vs 21.3	10.67 NS	4632 vs 4800	1.04 NS
ERROR MEANS SQUARE		53.78		0.85
LOCATION D				
SOIL RESIDUAL N VS ALL ADDED N RATES	14.0 vs 26.9	373.78 **	6213 vs 6411	2.20 NS
25# ADDED N VS 50 AND 75# ADDED N	27.3 vs 26.7	.89 NS	6400 vs 6416	.01 NS
50# ADDED N VS 75# ADDED N	25.3 vs 28.0	10.67 NS	6133 vs 6700	12.04 NS
ERROR MEANS SQUARE		26.11		2.04

NS = NON SIGNIFICANT, \*\*P = 0.01